

REMARKS

The Examiner is thanked for the thorough review and consideration of the pending application. The Final Office Action dated April 15, 2009, has been received and its contents carefully reviewed.

Summary of Office Action

Claims 11-15 and 17-18 stand rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Molsen et al. (U.S. Patent No. 6,122,024) in view of Sakai et al. (U.S. Patent No. 6,222,603) and further in view of Kubota et al. (U.S. Patent No. 6,429,914).

Claim 22 stands rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Molsen et al. in view of Sakai et al., Kubota et al., and further in view of Hiji et al.(U.S. Patent No. 5,872,609).

Summary of Amendment

Claim 11 has been amended referring to figures 6A and 6B. No new matter has been added. Hence, claims 11-15, 17-18 and 22 are pending for consideration.

All Claims Comply With § 103

Claims 11-15, 17 and 18 stand rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Molsen et al. in view of Sakai et al. and further in view of Kubota et al. Claim 22 stands rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over Molsen et al. in view of

Sakai et al., Kubota et al., and further in view of Hiji et al. Applicant respectfully traverses this rejection.

As amended, independent claim 11 recites, in part, “wherein the photo-reactant material and the liquid crystal material form a polymer network, the polymer network including the photo-reactant material and the liquid crystal material are aligned in a first direction without distinction of layer by irradiated an ultraviolet light in curing the sealant, wherein, when a voltage is applied across the two electrodes, the liquid crystal and photo-reactant material are arranged according to the applied electric field in the horizontal direction, and wherein, when the voltage is not applied across the two electrodes, the polymer network increases a restoring force to restore the liquid crystal.”

Molsen et al. fails to teach or suggest such at least features of the claimed invention. In particular, Molsen et al. discloses that nematic liquid crystals 8 and helical polymer network 9 are distinguished and formed to a plurality of layer, wherein the helical polymer network 9 causes the nematic liquid crystals 8 to adopt a herical twist in the absence of an applied field, and further wherein the twisted liquid crystals 8 are arranged by the applied electric field, between upper and lower electrodes 2 and 5, in a vertical direction. However, Molsen et al. fails to disclose that the photo-reactant material and the liquid crystal material form a polymer network, the polymer network including the photo-reactant material and the liquid crystal material are aligned in a first direction without distinction of layer by irradiated an ultraviolet light in curing the sealant as claimed. Also, Molsen et al. fails to disclose that when a voltage is applied across

the two electrodes, the liquid crystal and photo-reactant material are arranged according to the applied electric field in the horizontal direction, and that when the voltage is not applied across the two electrodes, the polymer network increases a restoring force to restore the liquid crystal, as claimed.

Sakai et al. does not and cannot cure at least this deficiency.

Kubota et al. discloses that a poly dispersion 12 comprising a liquid crystal 18 and a liquid crystalline polymer 17 can be used in IPS type LCD, wherein, when a voltage is applied between electrodes 7 and 8, the polymer 17 increases a difference in the refractive index between the liquid crystal 18 and a scattering state is obtained. In Kubota et al., the polymer 17 is proposed for increasing the difference in the refractive index between the liquid crystal 18 for the scattering state and the polymer 17 is not the photo-reactant material reacting by irradiated an ultraviolet light in curing the sealant. However, the present invention proposes the photo-reactant material for light-aligning the liquid crystal material by irradiated an ultraviolet light in curing the sealant. Hence, Kubota et al. fails to disclose that the photo-reactant material and the liquid crystal material form a polymer network, the polymer network including the photo-reactant material and the liquid crystal material are aligned in a first direction without distinction of layer by irradiated an ultraviolet light in curing the sealant as claimed.

Also, Kubota et al. discloses that the liquid crystal 18 rotates according to a horizontal electric field while liquid crystalline polymer 17 is fixed without moving as shown in figure 6. However, Kubota et al. fails to teach or suggest that the liquid crystal and photo-reactant material

are arranged in the horizontal direction when a voltage is applied across the two electrodes and that the polymer network increases a restoring force to restore the liquid crystal when the voltage is not applied across the two electrodes as claimed. In the claimed invention, the liquid crystal and photo-reactant material are arranged in the same direction by the applied voltage, thereby obtaining an effect of good black. However, Kubota et al. discloses that the direction of the liquid crystal 18, rotated by the applied voltage, is different from the direction of the polymer 17, thereby obtaining the scattering state. Hence, the effect of Kubota et al. is difference from the effect of the claimed invention.

Therefore, Molsen et al. and Sakai et al., whether taken individually or in combination, fail to teach all the features of independent claim 11 and claims 12-18, depend from claim 11. Also, Kubota et al., fails to teach all the features of independent claim 11 and claims 12-18, depend from claim 11.

Claim 22 also depends from independent claim 11, thereby incorporating all the features of claim 11. Hiji et al. discloses a light control layer 50 laminated a non-sensitive layer 51 and a sensitive layer 52 alternately in the vertical direction and containing an oriented liquid crystal as shown in Fig 1A to 2B. When voltage is applied between electrode 43 and 44, the liquid crystal molecules in the non-sensitive layer 51, which is formed in high crosslinking density area, which does not respond to the voltage and only the liquid crystal molecules in the sensitive layer 52, which is formed in low crosslinking density area, easily respond to the voltage and changes into the other direction. This causes a difference in refractive index between the non-sensitive layer 51 and the sensitive layer 52. However, Hiji et al. does not disclose that the photo-reactant

material and the liquid crystal material form a polymer network, the polymer network including the photo-reactant material and the liquid crystal material are aligned in a first direction without distinction of layer by irradiated an ultraviolet light in curing the sealant; and that when a voltage is applied across the two electrodes, the liquid crystal and photo-reactant material are arranged by the applied electric field in the horizontal direction; and that when the voltage is not applied across the two electrodes, the polymer network increases a restoring force to restore the liquid crystal, as claimed. Also, Applicant respectfully submits that it is no motivation to combine Hiji et al., using a light control layer 50 laminated a non-sensitive layer 51 and a sensitive layer 52 alternately in the vertical direction and driven by the vertical electric field, and Kubota et al., using the poly dispersion 12 comprising a liquid crystal 18, driven by the horizontal electric field, and a liquid crystalline polymer 17. Therefore, Molsen et al., Sakai et al. and Hiji et al., whether taken individually or in combination, fail to teach all the features of claim 22 for at least the reason discussed above. Also, Kubota et al., fails to teach all the features of claim 22, depend from claim 11, for at least the reason discussed above.

CONCLUSION

In view of the foregoing, Applicant respectfully requests entry of the amendments, reconsideration and the timely allowance of all pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicant's undersigned representative to expedite prosecution.

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Respectfully submitted,

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